Effects of Soil Moisture, Bulk Density, and Tillage Treatments on Tropical Root Crops

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ABSTRACT

This report describes the effects of field, lysimetric and greenhouse investigations on growth, root development, and yield of tropical root crops under varying soil moisture and bulk density regimes, and different systems of seedbed preparation. The basic information reported is on plant-water relations of cassava, sweet potato, and cocoyam; root growth-soil density relationship for cassava, and tuber yield of cassava grown under no-till and conventional methods of seedbed preparation.

During the daytime (0800-1700 hours), the stomatal diffusion resistance of the lower side of a leaf varied between 1-17, 1.5-13 and 1.5-21 sec cm^{-1} for cassava, sweet potato and cocoyam, respectively, depending on the cultivar and water table level. In the same sequence, leaf water potential ranged between -1.8 and -3.6, -3 and -11.3 and -0.4 and -8.2 bars, respectively. Although statistically insignificant, the root length density of cassava varied between 0.02 - 0.06 cm root length cm^{-3} soil, root weight density between $0.1x10^{-4}$ to $18x10^{-4}$ kg cm^{-3} and dry weight of tuberous roots between 0.01 - 0.99 kg/plant depending on time of harvesting and soil compaction levels. The bulking rate of tuberous roots was always higher in soilbeds compacted to bulk densities of 1.4 and 1.8 g cm^{-3} than to 1.6 g cm^{-3}. Tuber yield of cassava was not affected by tillage methods.

Leaching Losses and Recovery of Fertilizer Nitrogen in Cassava/Maize Intercrop Grown in Lysimeters

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ABSTRACT

The ability of cassava/maize intercrop to utilize applied fertilizer nitrogen in the high rainfall zone of Nigeria was tested in filled-in lysimeters during two cropping seasons. Maize and cassava together recovered 36.6% and 43.7% of the applied N in 1979 and 1980, respectively. Maize was more efficient than cassava in recovering fertilizer N. Maize grain absorbed 16.5% and 24.8% of the applied N in 1979 and 1980, respectively, while 6.4% and 4.5% were taken up by cassava tuberous roots. A high proportion of the total precipitation was recorded as percolates once the soil was saturated. Percolation was higher in lysimeter units that received no N treatment than those treated with 100 kg N/ha.